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ABSTRACT

Wages in the private sector are generally determined by labor supply and demand. In education, wages are frequently conditioned by political processes leading to severe irrationality in the salary policies of the institution. Hypotheses were tested that saw a school district's salary level as a function of the community's socioeconomic, cultural, and educational statuses; the levels of teacher experience; teacher training; and other teacher quality characteristics. Surveys showed that teacher salaries were unrelated to a community's cultural and educational levels and to the level of teacher training. Salaries varied directly with teacher experience and with community socioeconomic status except in very low status communities. Teaching quality was related to teacher salaries, but the direction of the relationship varied with the measure of quality. From an economic perspective, teacher salaries in New York State are determined irrationally and without information as to the influence of teacher quality on the learning process. (RA)

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AN INVESTIGATION OF THE DETERMINANTS AND THE CONSEQUENCES OF VARIATION IN TEACHERS SALARIES IN NEW YORK STATE

A report prepared for the
Bureau of Educational Finance Research
of the New York State Education Department

by

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AN INVESTIGATION OF THE DETERMINANTS AND THE CONSEQUENCES OF VARIATION IN TEACHERS SALARIES IN NEW YORK STATE

The purpose of this investigation was to identify the determinants and the consequences of variance in teachers salaries in New York State. In the private sector wage determination has been widely studied. In contrast little is known of how the legally prescribed salary mechanisms of the public sector, including public schools, interact with the economic forces of the labor market. Without such understanding there is no hope of maximizing the educational benefits to society and to individuals from the resources allocated to education. Approximately 70% of the operating expenditures of schools are for procuring the services of teaching personnel.

Theory of wage determination in the private sector. The process of wage determination in the private sector (the pricing of labor) is usually explained by economists within the framework of the "marginal productivity wage theory." The essence of this theory is that each worker is paid in accordance with the amount which he adds to the total output of the firm. In order to express the theory in precise terms, a number of assumptions are normally made:

1. The objective of the employer is to maximize money profits.
2. Workers are homogeneous, i.e., are of equal ability in the eyes of the employer. (This assumption is sometimes stated in terms of groups of homogeneous workers in order to take account of differentials in individual ability, education and skill.)
3. Workers have full knowledge of the labor market; they know of job openings and wage rates offered.
4. Workers are motivated by the desire to maximize their money income, subject to a leisure restraint, and are, therefore, willing to move from job to job.[1]

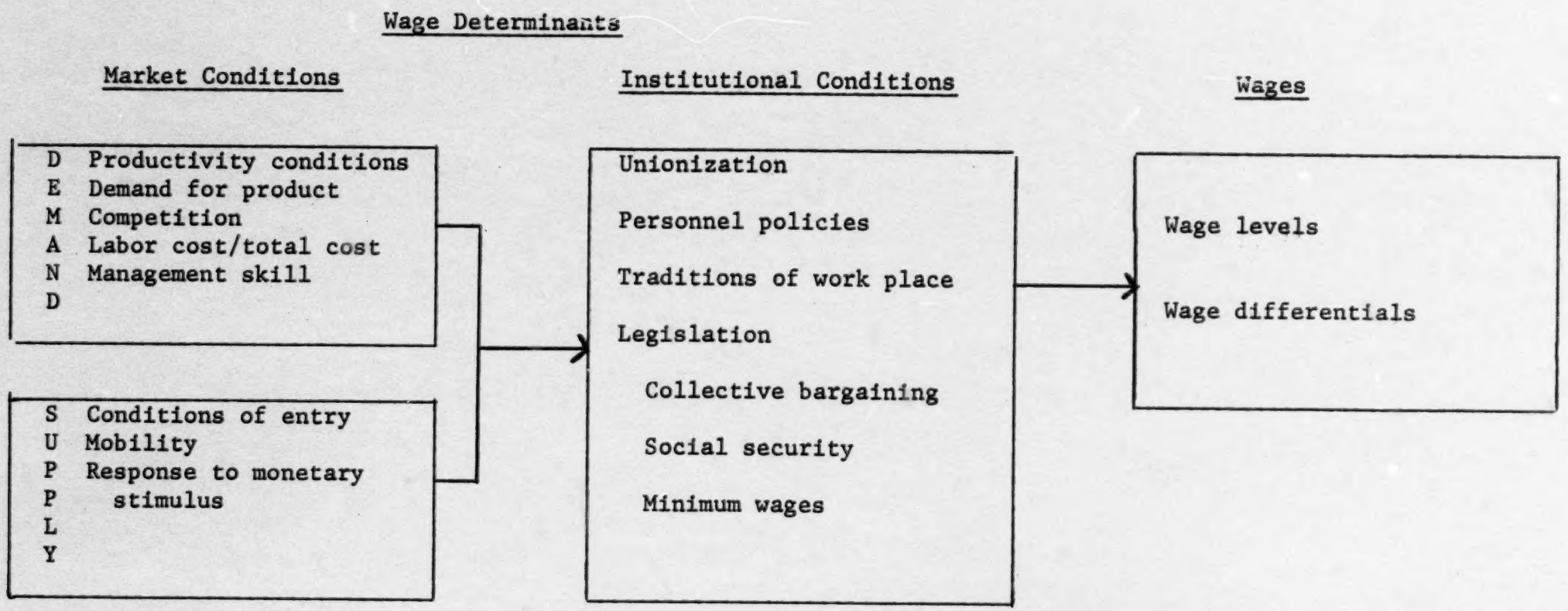
Figure 1 illustrates the causes of wage differentials among occupations as conceived by Butler.[2] The wage rates of the various occupations are determined by market conditions and institutional factors. Butler divides these determinants into two categories: 1) demand for labor; 2) supply of labor.

The demand for labor is determined by the demand for the final product and the conditions of productivity in the firm. The nature of the product demand is influenced by the competition in the market place, i.e., whether the firm is the only one selling this kind of product or whether it has many competitors who influence its pricing policies. The productivity conditions include the kind of technology available to the firm and the conditions under which capital and other factors of production are supplied, along with labor. If labor costs are a large fraction of total costs, the employer will be more cautious in adjusting his demand for labor. Finally, the demand for labor will also be influenced by the skill exhibited by management in mobilizing and organizing these factors.

The supply of labor depends on the conditions of entry into the occupation, including training and education requirements, the mobility of workers, and the way in which workers respond to monetary stimulus. The institutional factors include union organization, management personnel policies and the traditions of the work place. They also include such governmental forces as minimum wage laws, social security legislation and the regulation of collective bargaining practices.

At least one of the four assumptions underlying this theory does not apply to the public sector and to school employers in particular. This is the first assumption that the purpose of the employer is to maximize money profits. While in theory schools work to maximize the social benefits to

Figure 1. Wage Determination[a]



[a]Adapted from Arthur Butler. Labor Economics and Institutions. New York: Macmillan, 1963

be derived from the resources consumed by them, this is virtually impossible of measurement with our present knowledge-base because:

1. The objectives of public schools have not been clearly specified.
2. Adequate quantitative measures are not available for all objectives which have been specified.
3. There is no learning theory which adequately explains the relationship between inputs to the educational process and the resulting outcomes.
4. Educational production functions (the process by which inputs or factors of production are transformed into desired outputs) are little understood.

The few attempts which have been made to estimate educational production functions suggest that schools are operating at a low level of efficiency. No matter how well-intentioned school authorities are, there is no mechanism such as competition in the private sector for encouraging efficiency.

Wage determination in education. Wages in the private sector are negotiated between households and business firms through the labor market. Business firms desire to maximize profits and households desire to maximize wages. The desires of both groups are monitored by competition in the market. In education, even though labor must be procured through the same market, the decisions on wage policies are made through a political process which frequently ignores the conditions of that market. This can lead to severe irrationality in the salary policies of educational institutions, with perverse results as will be shown later.

Through the political process, the "single salary schedule" has been developed as the principal mechanism for determining teachers salaries. It is normally based on number of years of teacher experience and extent of

college preparation.[3] Figure 2 depicts a representative single salary schedule. Persons at upper levels of the schedule, either in training or experience, earn more money than those at lower levels. The salary differentials are often determined by some ratio or index procedure. This mechanism for determining teachers salaries evolved from earlier salary schedules which made distinctions according to sex, grade level, and subject area. It is called "single" because it makes no such distinctions.

The New York State Legislature has enacted a minimum salary schedule similar to this format which applies to all school districts (as have most other state legislatures). Actual salary schedules, which typically exceed the state minimum, are negotiated between each school district and representatives of its certified personnel. This process has resulted in considerable variation in salary scales within and among regions of the state. The metropolitan New York City area tends to have the highest remuneration policies, with upstate rural areas having the lowest.

Levin has made a significant analysis of salary determination in education.[4] He claims that there is no clearly defined pool of teachers. He suggests that virtually any holder of a baccalaureate degree can be employed as a classroom teacher even if only on a provisional basis. In addition, Levin notes the large number of married women who regularly exercise the option of entering or leaving the profession, to or from the position of housewife. The fact that approximately 40% of the classroom teachers of New York State do not hold a permanent teaching certificate lends credence to his argument. This is considerably different from the situation for other professions such as medicine, nursing, architecture, law, etc. where proper licensing is a prerequisite to practice.

Figure 2. A Sample Single Salary Schedule for Teachers

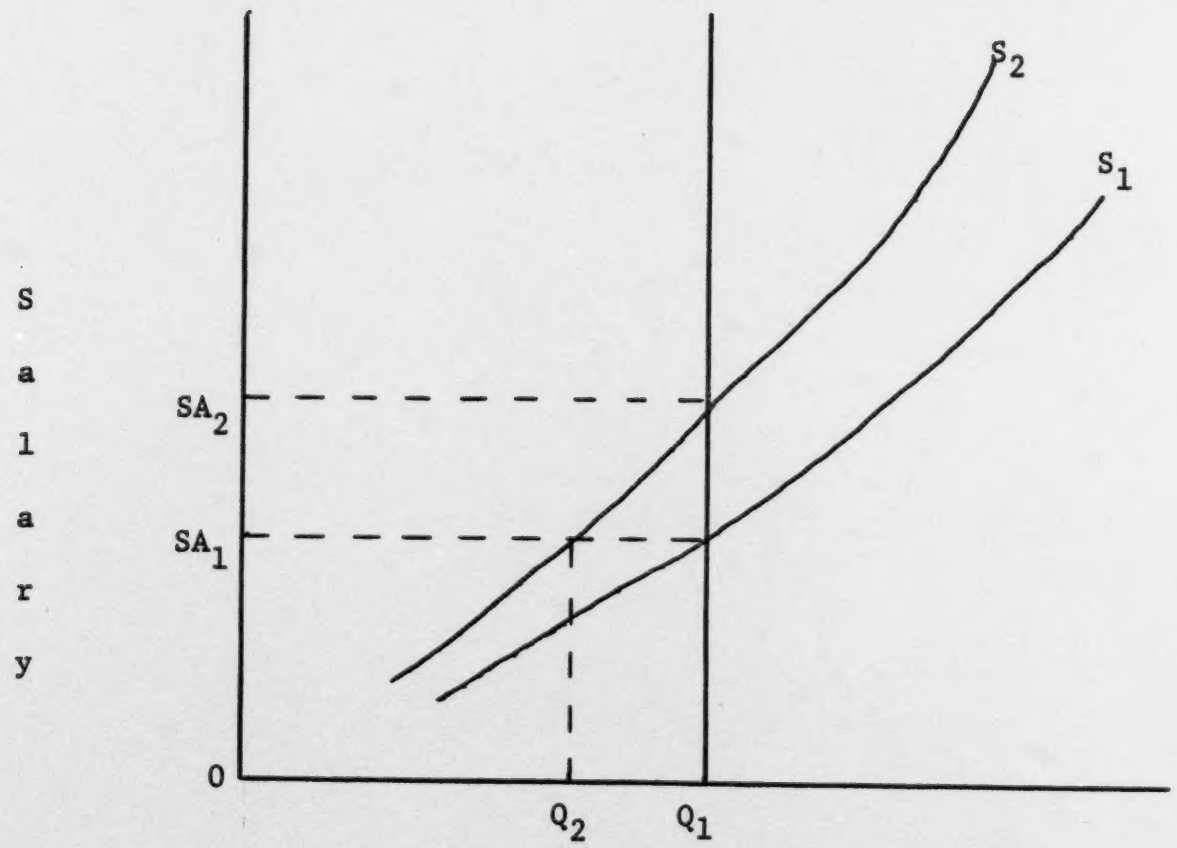
Years of Experience Step	Degree Status			
	BA	MA	MA + 30*	PhD
1	$ 7000	$ 7500	$ 8000	$ 8500
2	7300	7900	8400	8900
3	7600	8300	8800	9300
4	.	.	.	.
5	.	.	.	.
6	.	.	.	.
7	.	.	.	.
8	.	.	.	.
9	.	.	.	.
10	.	.	.	.
11	.	.	.	.
12	.	.	.	.
13	.	.	.	.
14	11200	13100	13600	14100
15	11500	13500	14000	14500

*graduate credit hours

Levin further sees the number of personnel employed as being largely determined by tradition or other factors not under the control of the local district. Likewise, the district holds little discretion over the size of its expenditure since this is pretty well fixed by the magnitude of its tax base and by state and federal aid policies. This leaves the district with only one variable to manipulate, the quality of personnel employed. Figure 3 illustrates Levin's concept of the demand and supply of teachers. The supply curve S_2 pertains to persons who possess qualities ideally desired by the district--for example, fully meeting requirements for permanent certification by the state. The supply curve S_1 pertains to persons of a hypothetically lower quality. The constraints of state and federal aid and the size of the local tax base lead the district to establish a salary at level SA_1. At this level it can only acquire Q_2 teachers of the S_2 type, falling short of its required number, Q_1. In order to fill all positions, the district must compromise on its quality standards and recruit from the S_1 pool of teachers. To satisfy both of its quantity and quality demands, a salary of SA_2 would be required. Such a level is beyond the resources of the district.

For the purposes of this investigation, the important concept is that salary policies and quantity policies are determined independently of market considerations. But since teachers are procured from the labor market, these decisions result in variation of the quality of personnel acquired. Levin has carefully documented several of the perverse consequences of this procedure for four metropolitan areas. For example, ignoring (through the single salary schedule) the fact that the undefined pool of persons which may be recruited to fill classroom positions consists of several categories of persons with differing alternatives of employment has resulted in the employment of persons at the same salary with varying qualities. Obvious

Figure 3. Demand and Supply of Teachers[a]



[a]Henry M. Levin. "Recruiting Teachers for Large City Schools." (Unpublished manuscript, Stanford University, 1968), pp. 6-10.

categories include: male, female, white, Negro, and types of undergraduate training, e.g., mathematics, physical education, etc. In order to acquire persons with qualifications comparable to the average of white females now teaching in an eastern metropolitan area, Levin estimates that that area would have had to average $7,279 in salary for a given year for non-white males, $6,885 for non-white females and $7,216 for white males. White females were receiving an average salary of $6,981 at the time.[5] That area's salary policy in effect had resulted in the employment of relatively well qualified non-white females and relatively poorly qualified males, both white and black.[6]

A similar phenomenon pertains for teachers with various undergraduate majors.[7] Potential teachers who are preparing in mathematics and science hold many more employment options than do those who major in elementary education or social studies. Levin's data show that fewer than half of the science and mathematics classes were conducted by teachers with an undergraduate major in mathematics or science. Despite the fact that his four metropolitan areas appeared to have an overabundance of teachers with undergraduate majors in social studies, only about half to two-thirds of social studies courses were taught by majors in that area. Social studies majors were being used to fill vacancies in shortage areas. On the other hand, despite the acute shortage, a small percentage of majors in science and mathematics were assigned to teach in the humanities and social studies. Levin concludes:

> What follows from this analysis is that much of the misassignment that presently takes place in the urban ghetto schools--as well as other schools--could be remedied by a teacher recruitment policy which more nearly reflects the realities of the marketplace. It is only by accepting the fact that persons with training in different majors command different salaries that "shortages" of chemistry, physics, mathematics, and other majors will cease to be a problem to the schools.[8]

Factors influencing the acceptance of employment with educational institutions. Although wage policies are determined in the public sector through the political process, the determination by households whether to accept the wage offer of educational institutions or alternative employment opportunities is made entirely in the private sector. From the standpoint of the individual, three decisions must be made. First, should he sell his services to educational institutions or to other potential employers? If the decision is in favor of educational institutions, he faces a second decision as to the region in which to seek employment; finally, he must decide upon a specific institution. Even if the initial decision is made in favor of employment with an educational institution, the individual continues to hold the options of seeking employment elsewhere with non-educational firms, with another educational institution, or to remain where he is.

Salary and lifetime earning expectation from educational employment appear to be a determining consideration in initially seeking employment with educational institutions. Hasler, for example, found that salary is significantly associated with the rejection of teaching as a career among potential teachers from high socio-economic backgrounds. On the other hand, salary is associated with the acceptance of a teaching career from potential teachers with lower socio-economic backgrounds.[9]

Salary appears to be one of the less important incentives for moving from one educational institution to another for persons established in teaching. In a study of mobility of experienced teachers among the five major metropolitan areas of New York State (Albany, Buffalo, New York, Rochester and Syracuse), Rentschler found that for the 1965-66 school year, of the 5,726 experienced teachers accepting new positions within these

metropolitan areas, only 230 moved from one metropolitan area to another.[10] This was despite the fact that the average salary in the New York metropolitan area ranged from $900 above the average paid in the Rochester area, to $1,550 above the average in the Buffalo metropolitan area. Cost of living differences between Rochester and New York were negligible; between Buffalo and New York, they were only 4% lower in Buffalo. Of the mobiles, only 6% indicated that they moved to seek higher salaries. The principal reasons for moving were spouse transfer or to be nearer home. These reasons were given by 57% of the respondents; 15% were looking for a better teaching situation; and 13% were looking for better living conditions.

In a parallel study for the eight-county western New York region, Doino found that 905 experienced teachers moved within this region during the 1965-66 school year.[11] Only 11.4% moved for the stated purpose of securing higher salaries. As with inter-metropolitan mobiles, transfers within this contiguous rural-metropolitan area showed that 39% transferred either because of spouse transferal or to be nearer home. Twenty-one per cent transferred because of dissatisfaction with their job. Doino noted that there was a definite direction in the movement of experienced teachers. This movement:

> ...is from the rural area to small cities and suburbs, and from the core city to the suburbs. With the exception of some movement from the suburbs to rural areas and between the two [classifications of] suburbs [high and middle socio-economic status], all other movement can be termed negligible.[12]

In summarizing the conclusions of the cited studies of wage determination in educational institutions, it can be stated that salary schedules (wage offered) are determined in large measure independently of the labor market through a political process which generates unintended consequences. There remains an urgent need for greater insight into the determinants of teachers salaries and the employment consequences of existing policies.

Study Design

With this background, it was hypothesized that the principal determinants of the general salary level paid by a district were its socio-economic status, availability of cultural activities and advanced educational opportunities, teacher experience, and the level of teacher training. It was finally hypothesized that the variance in salary levels independent of those four factors would be positively related to other indices of teacher quality. Thus, a district's salary level was seen as a function of its socio-economic status, its cultural and educational status, the levels of experience and training of the teachers it employs, and other quality-related teacher characteristics. The following formula expressed this hypothesized relationship:

$$S_i = f(W_i, X_i, Y_i, Z_i, Q)$$

where S = salary level criterion
W = socio-economic factor
X = cultural and educational opportunities factor
Y = experience level of classroom teachers factor
Z = training level of classroom teachers factor
Q = quality of teaching staff independent of levels of experience and training factor
i = individual school district

The consequences of existing policies on teachers salaries were seen as a function of salary levels controlled for socio-economic status, cultural and educational status, and the level of experience and training of the teachers employed.

$$Q_i = f(S_i \cdot W_i, X_i, Y_i, Z_i)$$

Hypotheses. More specifically, the following hypotheses were tested:

H1. Teachers salaries will vary directly according to the general socio-economic status of school districts (counties).

H2. Teachers salaries will vary inversely with the general cultural status of school districts (counties) once the effect of their socio-economic status has been removed.

H3. Teachers salaries will vary directly with teacher experience once the effects of school districts' (counties') socio-economic and cultural statuses have been removed.

H4. Teachers salaries will vary directly with level of teacher training once the effect of school districts' (counties') socio-economic and cultural statuses and teacher experience have been removed.

H5. The quality of school districts' (counties') teaching staffs will vary directly according to teachers salaries once the effects of the districts' (counties') socio-economic and cultural statuses and teacher experience and teacher training have been removed.

Hypothesis 1 proposes that the higher the socio-economic level of a community, the higher will be the salaries it pays to its teachers. High socio-economic communities are linked with high demand for educational services and high costs of living. Both factors should contribute toward higher teachers salaries.

The second hypothesis proposes that teachers salaries are lower for communities where the general cultural and educational status is high. It assumes that communities with a variety of cultural activities are more attractive to teachers than communities which are not so endowed. Also, teachers frequently refresh their professional training by taking graduate courses on a part-time basis in the evenings and during the summers.

Accordingly, communities which have graduate institutions readily available are assumed to be more attractive to teachers than those which do not. Communities which possess such cultural and educational attributes provide non-monetary benefits which it is hypothesized, diminish the amount of salary demanded.

The third and fourth hypotheses stem directly from the structure of the single salary schedule, teacher experience being its vertical dimension and teacher training the horizontal dimension. A relatively larger payment is made for experience than for level of training; therefore, the experience factor was expected to dominate the training factor and consequently was stated first. The implication of stating the two community factors prior to the two factors concerning teacher characteristics is that the latter is at least in part conditioned by the former.

The fifth hypothesis states the expectation that payment of salaries in excess of that which would be predicted from the previously stated community factors and teacher characteristics would result in other positive characteristics of teacher quality. Salaries below the predicted level are hypothesized to have an adverse effect on teacher quality.

Unit of Study. The optimum unit of study would be the individual school district; however, indices of socio-economic and cultural status are not available for this unit. These measures are available for counties. School district data for other variables, such as teacher characteristics and measures of staff quality, can be combined for counties with no serious loss of accuracy. Accordingly, the five counties comprising New York City (Manhattan, Bronx, Queens, Kings and Richmond), plus the five large upstate cities (Albany, Buffalo, Rochester, Syracuse, and Yonkers), plus the five upstate counties, exclusive of these cities (Albany, Erie, Monroe, Onondaga and Westchester),

plus the remaining fifty-two counties in their entirety are the units of study. They are the smallest units for which satisfactory data can be obtained on all variables.

Statistical Design. The investigation was a one-year cross-sectional study for the 1967-68 academic year. The data were subjected to a stepwise multiple-regression analysis for all subjects. The order of entry of the variables into the analysis was as indicated in the statement of hypotheses with the socio-economic variables first, followed by cultural status and educational opportunity variables, teacher experience variables, and teacher training variables. The consequences of teacher salaries were determined by examining the partial correlations between teachers salaries and the pupil achievement and permanent certification variables, holding constant community and teacher characteristic factors. Parallel analyses were made for the total sample, for metropolitan counties exclusive of central cities and their central cities (23 units), and for non-metropolitan counties (44 units).

Measurement of Variables. Three indices of the level of teachers salary were used as criteria. They were the 25th percentile salary for classroom teachers, the 50th percentile, and the 75th percentile for each unit. Eleven indices of socio-economic status were examined: per cent of population which is Negro, median years schooling completed of persons over 25 years of age, per cent of work force employed in manufacturing, median home value, median rent, median family income, per cent of labor force employed in white collar occupations, per cent of housing units owner occupied, per cent of first grade students scoring in the upper three stanines, per cent scoring in the middle three stanines, and per cent scoring in the lower three stanines in reading readiness.

Only one measure of cultural status and opportunities for graduate study was used. If the unit was in a major metropolitan area, it was given a score of 1; if not, it was given a score of zero. The rationale for this procedure is that universities, professional theater, professional music, museums, and other cultural opportunities are concentrated in metropolitan areas.

Five indices were used to measure teacher experience: per cent classroom teachers with less than five years of experience, per cent six to ten years experience, per cent eleven to fifteen years of experience, per cent sixteen through twenty years of experience, and per cent greater than twenty years of experience. Three factors were used as indices of the level of teacher training. These were: per cent of classroom teachers holding a BA degree, per cent of classroom teachers holding a MA degree or who had accumulated 30 hours of graduate credit beyond the BA degree, and per cent of classroom teachers holding a doctorate or 30 hours of graduate credit beyond the MA degree.

Table 1 shows the mean and standard deviation for each of the above indices of community and teacher characteristics and of salary level for the total sample, the metropolitan sub-sample, and the non-metropolitan sub-sample. It also presents the code to be used in subsequent tables and the unit of measurement. Their zero order correlations are shown in Table 2 for the total sample, Table 3 for the metropolitan counties and big cities and, Table 4 for non-metropolitan counties.

The zero order correlations were examined for indices which were highly correlated. Several of the original variables were eliminated from the subsequent stepwise regression analyses when they shared at least 50% common variance with another variable. The judgment of the investigators was used

Table 1. Means and Standard Deviations of Community and Teacher Characteristics for All Units, Metropolitan Counties and Big Cities, and Non-metropolitan Counties

Item	Code	Unit	Total		Metropolitan		Non-me
			Mean	St.Dev.	Mean	St.Dev.	Mean
* 1. 25th % classroom teachers salary	25th %ile	dollars	7261.18	329.03	7401.30	424.68	7187.93
* 2. 50th % classroom teachers salary	50th %ile	dollars	8870.36	505.51	9178.56	658.47	8709.25
* 3. 75th % classroom teachers salary	75th %ile	dollars	10467.15	855.91	11259.65	917.71	10052.88
*10. % teachers with permanent cert.	% perm. cert.	per cent	60.02	5.79	57.99	8.32	61.08
*13. % Negro	% Negro	per cent	2.87	4.06	5.73	5.67	1.37
*14. Median years schooling	Schooling	years	10.68	.76	11.05	.93	10.48
*15. % employed in manufacturing	% emp. mfg.	per cent	29.73	8.92	30.66	8.36	29.25
16. Median home value	med. hm. val.	dollars	11646.27	3951.77	14969.56	4654.38	9909.09
*17. Median rent	med. rent	dollars	71.72	10.06	79.13	11.43	67.84
18. Median family income	med. fam. inc.	dollars	5834.68	860.94	6675.95	835.02	5394.93
*19. % teachers with < 5 years exp.	% <5 yrs.	per cent	38.09	5.63	41.55	6.21	36.29
20. % teachers with 6-10 yrs. exp.	% 6-10 yrs.	per cent	20.44	2.45	21.77	2.31	19.75
21. % teachers with 11-15 yrs. exp.	% 11-15 yrs.	per cent	14.17	1.91	14.33	2.26	14.09
*22. % teachers with 16-20 yrs. exp.	% 16-20 yrs.	per cent	9.67	2.20	8.33	1.90	10.37
23. % teachers with > 20 yrs. exp.	% >20 yrs.	per cent	17.62	4.82	14.01	4.73	19.51
*25. % white collar workers	% white col.	per cent	40.36	6.97	47.64	5.24	36.55
26. % dwellings owner occupied	% own. occ.	per cent	66.45	15.38	56.62	22.75	71.60
*27. % pupils scoring in top 3 stanines in read.-readiness, grade 1	High Read. R.	per cent	30.03	7.69	27.74	11.07	31.23
28. % pupils scoring in middle 3 stanines in read.-readiness, grade 1	Av. Read. R.	per cent	58.74	3.76	57.04	3.42	59.62
29. % pupils scoring in bottom 3 stanines in read.-readiness grade 1	Low Read. R.	per cent	11.27	7.26	15.37	10.84	9.13
50. % teachers with BA	% BA	1%=.01	51.85	9.67	45.10	9.51	53.85
*51. % teachers with MA or BA+30	% MA or BA+30	1%=.01	36.20	4.07	39.36	4.55	34.55
*52. % teachers with MA+30 or Dr.	% MA+30 or Dr.	1%=.01	6.88	5.28	11.24	6.93	4.60

*Variable included in stepwise regression analysis.

Table 1. Means and Standard Deviations of Community and Teacher Characteristics for All Units, Metropolitan Counties and Big Cities, and Non-metropolitan Counties

Item	Code	Unit	Total		Metropolitan		Non-metropolitan	
			Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.
% classroom teachers salary	25th %ile	dollars	7261.18	329.03	7401.30	424.68	7187.93	240.63
% classroom teachers salary	50th %ile	dollars	8870.36	505.51	9178.56	658.47	8709.25	304.99
% classroom teachers salary	75th %ile	dollars	10467.15	855.91	11259.65	917.71	10052.88	426.62
chers with permanent cert.	% perm. cert.	per cent	60.02	5.79	57.99	8.32	61.08	3.55
ro	% Negro	per cent	2.87	4.06	5.73	5.67	1.37	1.47
n years schooling	Schooling	years	10.68	.76	11.05	.93	10.48	.57
loyed in manufacturing	% emp. mfg.	per cent	29.73	8.92	30.66	8.36	29.25	9.26
n home value	med. hm. val.	dollars	11646.27	3951.77	14969.56	4654.38	9909.09	1972.46
n rent	med. rent	dollars	71.72	10.06	79.13	11.43	67.84	6.62
n family income	med. fam. inc.	dollars	5834.68	860.94	6675.95	835.02	5394.93	452.24
chers with < 5 years exp.	% < 5 yrs.	per cent	38.09	5.63	41.55	6.21	36.29	4.38
chers with 6-10 yrs. exp.	% 6-10 yrs.	per cent	20.44	2.45	21.77	2.31	19.75	2.24
chers with 11-15 yrs. exp.	% 11-15 yrs.	per cent	14.17	1.91	14.33	2.26	14.09	1.72
chers with 16-20 yrs. exp.	% 16-20 yrs.	per cent	9.67	2.20	8.33	1.90	10.37	2.03
chers with > 20 yrs. exp.	% > 20 yrs.	per cent	17.62	4.82	14.01	4.73	19.51	3.68
e collar workers	% white col.	per cent	40.36	6.97	47.64	5.24	36.55	4.17
lings owner occupied	% own. occ.	per cent	66.45	15.38	56.62	22.75	71.60	4.39
ls scoring in top 3 es in read.-readiness, 1	High Read. R.	per cent	30.03	7.69	27.74	11.07	31.23	4.89
ls scoring in middle 3 es in read.-readiness, 1	Av. Read. R.	per cent	58.74	3.76	57.04	3.42	59.62	3.66
ls scoring in bottom 3 es in read.-readiness 1	Low Read. R.	per cent	11.27	7.26	15.37	10.84	9.13	2.66
hers with BA	% BA	1%=.01	51.85	9.67	45.10	9.51	53.85	8.40
hers with MA or BA+30	% MA or BA+30	1%=.01	36.20	4.07	39.36	4.55	34.55	2.59
hers with MA+30 or Dr.	% MA+30 or Dr.	1%=.01	6.88	5.28	11.24	6.93	4.60	1.64

cluded in stepwise regression analysis.

Table 2. Zero Order Correlation Matrix of Salary Level, Community Characteristic, and Teacher Characteristic Indices for All New York State Counties and Big Cities

Independent Variable	Socio-Economic Status										Metro Area	Teacher Experience					Teacher Training			%ile T 25
	13.*	14.*	15.*	16.	17.*	18.	25.*	26.	27.*	28.	29.	12.*	19.*	20.	21.	22.*	23.	50.	51.*	52.*	1.*
Socio-Economic Status																					
*13. % Negro	1.00	-.16	-.16	.17	.24	.20	.39	-.85	-.60	-.48	.81	.51	.49	.25	-.22	-.51	-.38	-.46	.39	.65	.30
*14. Schooling		1.00	.00	.48	.61	.66	.63	.23	.42	.00	-.36	.36	.01	.35	.40	.02	-.35	-.01	.34	.19	.15
*15. % emp. mfg.			1.00	-.02	-.13	.18	-.16	.14	.18	-.14	-.11	.08	.17	.06	-.01	-.18	-.14	.36	-.34	-.26	-.23 -
16. med. hm. val.				1.00	.74	.84	.71	-.16	.05	-.30	.14	.61	.41	.39	.12	-.34	-.57	-.24	.44	.46	.32
*17. med. rent					1.00	.85	.69	-.02	.08	-.16	.04	.54	.34	.54	.28	-.22	-.67	-.25	.42	.56	.43
18. med. fam. inc.						1.00	.79	-.08	.16	-.29	.03	.71	.41	.54	.29	-.34	-.71	-.25	.45	.53	.35
*25. % white col.							1.00	-.39	-.01	-.37	.24	.76	.35	.45	.21	-.35	-.56	-.47	.71	.66	.37
26. % own. occ.								1.00	.66	.44	-.86	-.47	-.45	-.06	.27	.51	.22	.48	-.39	-.60	-.16 -
*27. High Read. R.									1.00	-.18	-.86	-.22	-.24	.08	.27	.25	.02	.34	-.06	-.34	-.25 -
28. Av. Read. R.										1.00	-.30	-.33	-.44	-.13	.16	.45	.31	.06	-.29	-.27	-.04 -
29. Low Read. R.											1.00	.41	.49	-.01	-.32	-.48	-.22	-.40	.25	.50	.22
Cultural Opportunities																					
*12. Metro. area												1.00	.45	.40	.06	-.44	-.55	-.43	.57	.60	.31
Teacher Experience																					
*19. % < 5 yrs.													1.00	.20	-.45	-.79	-.74	.02	.00	.35	-.21 -
20. % 6-10 yrs.														1.00	.25	-.42	-.66	-.16	.29	.38	.26
21. % 11-15 yrs.															1.00	.32	-.15	-.19	.40	.17	.16
*22. % 16-20 yrs.																1.00	.56	.01	-.07	-.29	.15
23. % > 20 yrs.																	1.00	.13	-.26	-.53	-.01 -
Teacher Training																					
50. % BA																		1.00	-.69	-.67	-.37 -
*51. % MA or BA+30																			1.00	.63	.34
*52. % MA+30 or Dr.																				1.00	.35

*Variables included in the stepwise regression analysis.

Table 2. Zero Order Correlation Matrix of Salary Level, Community Characteristic, and Teacher Characteristic Indices for All New York State Counties and Big Cities

iable	Socio-Economic Status										Metro Area	Teacher Experience					Teacher Training			%ile 25	Tea. 50	Sal. 75
	13.*	14.*	15.*	16.	17.*	18.	25.*	26.	27.*	28.	29.	12.*	19.*	20.	21.	22.*	23.	50.	51.*	52.*	1.*	2.*	3.*
Status																							
	1.00	-.16	-.16	.17	.24	.20	.39	-.85	-.60	-.48	.81	.51	.49	.25	-.22	-.51	-.38	-.46	.39	.65	.30	.47	.66
		1.00	.00	.48	.61	.66	.63	.23	.42	.00	-.36	.36	.01	.35	.40	.02	-.35	-.01	.34	.19	.15	.12	.21
.			1.00	-.02	-.13	.18	-.16	.14	.18	-.14	-.11	.08	.17	.06	-.01	-.18	-.14	.36	-.34	-.26	-.23	-.21	-.11
al.				1.00	.74	.84	.71	-.16	.05	-.30	.14	.61	.41	.39	.12	-.34	-.57	-.24	.44	.46	.32	.35	.61
					1.00	.85	.69	-.02	.08	-.16	.04	.54	.34	.54	.28	-.22	-.67	-.25	.42	.56	.43	.47	.71
inc.						1.00	.79	-.08	.16	-.29	.03	.71	.41	.54	.29	-.34	-.71	-.25	.45	.53	.35	.41	.68
.							1.00	-.39	-.01	-.37	.24	.76	.35	.45	.21	-.35	-.56	-.47	.71	.66	.37	.49	.68
								1.00	.66	.44	-.86	-.47	-.45	-.06	.27	.51	.22	.48	-.39	-.60	-.16	-.36	-.49
R.									1.00	-.18	-.86	-.22	-.24	.08	.27	.25	.02	.34	-.06	-.34	-.25	-.34	-.36
.										1.00	-.30	-.33	-.44	-.13	.16	.45	.31	.06	-.29	-.27	-.04	-.13	-.32
.											1.00	.41	.49	-.01	-.32	-.48	-.22	-.40	.25	.50	.22	.37	.51
nities																							
												1.00	.45	.40	.06	-.44	-.55	-.43	.57	.60	.31	.44	.67
ce																							
													1.00	.20	-.45	-.79	-.74	.02	.00	.35	-.21	-.11	.38
.														1.00	.25	-.42	-.66	-.16	.29	.38	.26	.23	.41
.															1.00	.32	-.15	-.19	.40	.17	.16	.25	.13
																1.00	.56	.01	-.07	-.29	.15	.08	-.30
																	1.00	.13	-.26	-.53	-.01	-.12	-.57
30																		1.00	-.69	-.67	-.37	-.55	-.53
Dr.																			1.00	.63	.34	.52	.53
																				1.00	.35	.61	.81

ded in the stepwise regression analysis.

Table 3. Zero Order Correlation Matrix of Salary Level, Community Characteristic, and Teacher Characteristic Indices for Metropolitan New York State Counties and Big Cities

Independent Variable	Socio-Economic Status										Metro Area	Teacher Experience					Teacher Training			%ile 25
	13.*	14.*	15.*	16.	17.*	18.	25.*	26.	27.*	28.	29.	12.*	19.*	20.	21.	22.*	23.	50.	51.*	52.*	1.*
Socio-Economic Status																					
*13. % Negro	1.00	-.54	-.41	-.40	-.18	-.48	-.09	-.84	-.76	-.49	.81	.00	.33	-.01	-.36	-.54	-.04	-.51	.16	.55	.21
*14. Schooling		1.00	.04	.37	.57	.78	.61	.65	.78	.14	-.70	.00	-.30	.27	.54	.46	-.17	.16	.13	-.13	.09
*15. % emp. mfg.			1.00	-.11	-.10	.02	-.51	.38	.20	.17	-.23	.00	.16	-.21	-.16	.12	-.08	.68	-.64	-.56	-.34
16. med. hm. val.				1.00	.56	.71	.40	.28	.24	-.01	-.20	.00	-.05	.03	.22	.17	-.11	.01	.08	.07	.26
*17. med. rent					1.00	.87	.40	.46	.28	.23	-.31	.00	-.15	.49	.53	.35	-.43	-.14	.12	.32	.54
18. med. fam. inc.						1.00	.57	.61	.52	.21	-.52	.00	-.26	.37	.63	.53	-.35	-.01	.12	.14	.37
*25. % white col.							1.00	.07	.28	-.12	-.18	.00	-.31	.06	.46	.35	.02	-.50	.60	.43	.33
26. % own. occ.								1.00	.81	.50	-.89	.00	-.36	.36	.51	.57	-.17	.49	-.17	-.47	-.03
*27. High Read. R.									1.00	.21	-.93	.00	-.41	.29	.45	.53	-.02	.34	.03	-.38	-.22
28. Av. Read. R.										1.00	-.46	.00	-.25	.15	.32	.41	-.07	.11	-.12	-.08	-.05
29. Low Read. R.											1.00	.00	.49	-.33	-.48	-.60	-.02	-.37	.06	.39	.12
Cultural Opportunities																					
*12. Metro. Area												1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Teacher Experience																					
*19. % < 5 yrs.													1.00	-.30	-.68	-.79	-.53	.23	-.50	.05	-.43
20. % 6-10 yrs.														1.00	.59	.31	-.49	-.22	.20	.31	.25
21. % 11-15 yrs.															1.00	.81	-.21	-.32	.56	.22	.31
*22. % 16-20 yrs.																1.00	.10	-.15	.38	.02	.25
23. % > 20 yrs.																	1.00	.01	.15	-.33	.20
Teacher Training																					
50. % BA																		1.00	-.80	-.90	-.35
*51. % MA or BA+30																			1.00	.52	.28
*52. % MA+30 or Dr.																				1.00	.31

*Variables included in the stepwise regression analysis.

Table 3. Zero Order Correlation Matrix of Salary Level, Community Characteristic, and Teacher Characteristic Indices for Metropolitan New York State Counties and Big Cities

Variable	Socio-Economic Status										Metro Area	Teacher Experience					Teacher Training			%ile Tea. Sal. 25			50			75
	13.*	14.*	15.*	16.	17.*	18.	25.*	26.	27.*	28.	29.	12.*	19.*	20.	21.	22.*	23.	50.	51.*	52.*	1.*	2.*	3.*			
ic Status																										
	1.00	-.54	-.41	-.40	-.18	-.48	-.09	-.84	-.76	-.49	.81	.00	.33	-.01	-.36	-.54	-.04	-.51	.16	.55	.21	.37	.51			
ng		1.00	.04	.37	.57	.78	.61	.65	.78	.14	-.70	.00	-.30	.27	.54	.46	-.17	.16	.13	-.13	.09	-.07	-.08			
mfg.			1.00	-.11	-.10	.02	-.51	.38	.20	.17	-.23	.00	.16	-.21	-.16	.12	-.08	.68	-.64	-.56	-.34	-.43	-.39			
. val.				1.00	.56	.71	.40	.28	.24	-.01	-.20	.00	-.05	.03	.22	.17	-.11	.01	.08	.07	.26	.13	.23			
nt					1.00	.87	.40	.46	.28	.23	-.31	.00	-.15	.49	.53	.35	-.43	-.14	.12	.32	.54	.44	.57			
n. inc.						1.00	.57	.61	.52	.21	-.52	.00	-.26	.37	.63	.53	-.35	-.01	.12	.14	.37	.22	.32			
col.							1.00	.07	.28	-.12	-.18	.00	-.31	.06	.46	.35	.02	-.50	.60	.43	.33	.37	.36			
occ.								1.00	.81	.50	-.89	.00	-.36	.36	.51	.57	-.17	.49	-.17	-.47	-.03	-.24	-.31			
ad. R.									1.00	.21	-.93	.00	-.41	.29	.45	.53	-.02	.34	.03	-.38	-.22	-.33	-.45			
l. R.										1.00	-.46	.00	-.25	.15	.32	.41	-.07	.11	-.12	-.08	-.05	-.04	-.11			
l. R.											1.00	.00	.49	-.33	-.48	-.60	-.02	-.37	.06	.39	.12	.26	.43			
rtunities																										
rea												1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00			
ience																										
s.													1.00	-.30	-.68	-.79	-.53	.23	-.50	.05	-.43	-.43	-.02			
rs.														1.00	.59	.31	-.49	-.22	.20	.31	.25	.28	.32			
yrs.															1.00	.81	-.21	-.32	.56	.22	.31	.32	.21			
yrs.																1.00	.10	-.15	.38	.02	.25	.28	.05			
rs.																	1.00	.01	.15	-.33	.20	.17	-.25			
ing																										
																		1.00	-.80	-.90	-.35	-.66	-.66			
BA+30																			1.00	.52	.28	.48	.34			
or Dr.																				1.00	.31	.60	.78			

cluded in the stepwise regression analysis.

Table 4. Zero Order Correlation Matrix of Salary Level, Community Characteristic, and Teacher Characteristic Indices for Non-metropolitan New York State Counties

Independent Variable	Socio-Economic Status										Metro Area	Teacher Experience					Teacher Training			%ile 25
	13.*	14.*	15.*	16.	17.*	18.	25.*	26.	27.*	28.	29.	12.*	19.*	20.	21.	22.*	23.	50.	51.*	52.*	1.*
Socio-Economic Status																					
*13. % Negro	1.00	-.20	-.07	.58	.40	.40	.25	-.44	.12	-.43	.36	.00	.49	.25	-.27	-.30	-.45	-.02	.10	.08	.09
*14. Schooling		1.00	-.08	.32	.47	.39	.57	.01	.13	.15	-.44	.00	-.04	.23	.26	.03	-.22	.18	.26	.29	-.02
*15. % emp. mfg.			1.00	-.06	-.30	.33	-.25	.00	.26	-.25	-.13	.00	.15	.15	.07	-.28	-.14	.32	-.37	-.34	-.23
16. med. hm. val.				1.00	.77	.80	.64	-.45	.22	-.30	.01	.00	.64	.45	-.07	-.42	-.77	.08	.27	.57	-.02
*17. med. rent					1.00	.69	.66	-.21	.16	-.16	-.07	.00	.47	.37	.03	-.24	-.67	.10	.24	.60	.01
18. med. fam. inc.						1.00	.55	-.35	.31	-.34	-.10	.00	.67	.45	.04	-.54	-.80	.20	.01	.36	-.11
*25. % white col.							1.00	-.53	.21	-.25	-.04	.00	.32	.37	.07	-.25	-.50	-.04	.47	.50	.08
26. % own. occ.								1.00	-.10	.32	-.27	.00	-.30	-.24	-.02	.38	.31	.24	-.29	-.28	.07
*27. High Read. R.									1.00	-.84	-.68	.00	.23	.11	.07	-.17	-.27	.26	.18	.23	-.16
28. Av. Read. R.										1.00	.17	.00	-.43	-.07	.12	.33	.32	-.20	-.16	-.21	.17
29. Low Read. R.											1.00	.00	.18	-.10	-.28	-.15	.06	-.19	-.11	-.13	.06
Cultural Opportunities																					
*12. Metro. Area												1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Teacher Experience																					
*19. % < 5 yrs.													1.00	.29	-.39	-.74	-.78	.29	-.15	.33	-.39
20. % 6-10 yrs.														1.00	.02	-.59	-.63	.16	-.02	.09	.07
21. % 11-15 yrs.															1.00	.13	-.08	-.09	.31	.10	-.04
*22. % 16-20 yrs.																1.00	.63	-.27	.14	-.14	.43
23. % >20 yrs.																	1.00	-.25	-.03	-.41	.20
Teacher Training																					
50. % BA																		1.00	-.43	-.11	-.22
*51. % MA or BA+30																			1.00	.27	.09
*52. % MA+30 or Dr.																				1.00	-.09

*Variables included in the stepwise regression analysis.

Table 4. Zero Order Correlation Matrix of Salary Level, Community Characteristic, and Teacher Characteristic Indices for Non-metropolitan New York State Counties

	Socio-Economic Status										Metro Area	Teacher Experience					Teacher Training			%ile	Tea.	Sal.
ile	13.*	14.*	15.*	16.	17.*	18.	25.*	26.	27.*	28.	29.	12.*	19.*	20.	21.	22.*	23.	50.	51.*	52.*	25 1.*	50 2.*	75 3.*
tus																						
	1.00	-.20	-.07	.58	.40	.40	.25	-.44	.12	-.43	.36	.00	.49	.25	-.27	-.30	-.45	-.02	.10	.08	.09	.14	.52
		1.00	-.08	.32	.47	.39	.57	.01	.13	.15	-.44	.00	-.04	.23	.26	.03	-.22	.18	.26	.29	-.02	-.01	.03
			1.00	-.06	-.30	.33	-.25	.00	.26	-.25	-.13	.00	.15	.15	.07	-.28	-.14	.32	-.37	-.34	-.23	-.15	-.10
				1.00	.77	.80	.64	-.45	.22	-.30	.01	.00	.64	.45	-.07	-.42	-.77	.08	.27	.57	-.02	.06	.60
					1.00	.69	.66	-.21	.16	-.16	-.07	.00	.47	.37	.03	-.24	-.67	.10	.24	.60	.01	.06	.52
						1.00	.55	-.35	.31	-.34	-.10	.00	.67	.45	.04	-.54	-.80	.20	.01	.36	-.11	.00	.52
							1.00	-.53	.21	-.25	-.04	.00	.32	.37	.07	-.25	-.50	-.04	.47	.50	.08	.14	.35
								1.00	-.10	.32	-.27	.00	-.30	-.24	-.02	.38	.31	.24	-.29	-.28	.07	-.02	.17
									1.00	-.84	-.68	.00	.23	.11	.07	-.17	-.27	.26	.18	.23	-.16	-.13	.12
										1.00	.17	.00	-.43	-.07	.12	.33	.32	-.20	-.16	-.21	.17	.09	-.21
											1.00	.00	.18	-.10	-.28	-.15	.06	-.19	-.11	-.13	.06	.11	.08
ties																							
												1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
													1.00	.29	-.39	-.74	-.78	.29	-.15	.33	-.39	-.33	.33
														1.00	.02	-.59	-.63	.16	-.02	09	.07	-.17	.12
															1.00	.13	-.08	-.09	.31	.10	-.04	.17	.00
																1.00	.63	-.27	.14	-.14	.43	.49	-.05
																	1.00	-.25	-.03	-.41	.20	.16	-.44
																		1.00	-.43	-.11	-.22	-.23	-.03
																			1.00	.27	.09	.16	.08
																				1.00	-.09	.01	.37

d in the stepwise regression analysis.

to determine such eliminations. On this basis, per cent residences owner occupied was eliminated in favor of per cent Negro and per cent scoring in the top three stanines in reading readiness, grade 1. Median home value and median family income were eliminated in favor of median rent and per cent white collar workers. Per cent scoring in the middle three and low three stanines in reading readiness, grade 1, were eliminated in favor of per cent scoring in the top three stanines. All the experience indices were highly intercorrelated. Two were selected to represent the experience factor: a measure of low experience, per cent classroom teachers with less than five years of experience; and a measure of long experience, per cent of classroom teachers with sixteen to twenty years of experience. The three indices of training level were also highly intercorrelated. Per cent of classroom teachers holding a MA degree or a BA degree plus 30 hours of graduate credit and per cent holding a doctorate or a MA degree plus 30 hours of graduate credit were selected to serve as proxies for level of teacher training. In interpreting the results of the statistical analysis, it will be important to keep in mind that each index not only measures a specific characteristic but serves as a proxy for a general factor.

In addition to the above indices of teacher and community characteristics, 19 indices of teacher quality were used. The first was the percentage of teachers holding permanent state certificatin. The other 18 were measures of pupil achievement in reading and arithmetic for grades 3, 6 and 9. Permanent certification reflects the minimum standards established by the state for licensing as a professional teacher. Since per cent scoring in the top three stanines on reading readiness, grade 1, serves as a measure of pupils' academic ability at a very early state in the schooling process as well as a measure of socio-economic status, the statistical analysis used

permits the achievement measures for later grades to be interpreted as representing academic growth. Academic growth is considered here to be a product of teacher quality. An assumption has been made that the scores for first graders during the 1967-68 academic year are highly correlated with the scores which would have been made by third, sixth and ninth graders if they had been tested when they were in the first grade.

Limitations. Several limitations should be noted in interpreting the data. This is a cross-sectional study for a one-year period of time. As a result, any salary adjustments may not have had an opportunity to have had their full effect on other variables. A related problem is that the salary criteria have the inherent weakness of representing immediate earnings. Lifetime earning potential is a better measure of salary level, however, such data are not available.

The socio-economic data are for the year 1960 whereas teacher, salary and achievement data are for the year 1967-68. While socio-economic data tend to be relatively stable, some error may be introduced by the seven-year discrepancy.

There are shortcomings in the indices. Just how accurately they measure the concepts which they are purported to is difficult to determine despite the fact that they are measures which are commonly used for such purposes.

Budgetary constraints did not permit the collection of original data. The investigators were limited to only those indices which could be obtained directly from the New York State Education Department or from published sources.

Since socio-economic data are available only through the United States Census and for political sub-divisions, it was not possible to use the school district as a unit. As already noted, the units of study were: (1) the five

counties comprising New York City (Manhattan, Bronx, Queens, Kings and Richmond); (2) the five large upstate cities of Albany, Buffalo, Rochester, Syracuse and Yonkers; (3) the five upstate counties exclusive of these big cities; and (4) the other counties in their entirety.

Finally, inferential statistical procedures were used in preference to descriptive statistical procedures, even though the data are cited from non-random samples. This provided the analysts with a systematic way of focusing their analysis on the stronger factors.

Findings

Variance. Variation in most variables among metropolitan units is considerably greater than it is for non-metropolitan units. A cursory comparison of the standard deviations for the two sub-samples reported in Table 1 reveals this. This is not too surprising since non-metropolitan counties tend to be more comprehensive in the makeup of their population than are metropolitan counties. Non-metropolitan counties contain small cities, villages, towns and rural areas. Because their populations tend to approximate a general cross-section of the population of the state, the variation in their average statistics is not too great. The population of the metropolitan units, however, tends to be more homogeneous within the units, but more heterogeneous among units. Thus the variation in the average statistics among metropolitan units is greater. For example, Westchester County tends toward an upper-middle class population with high educational and income levels. The city of Buffalo, on the other hand, tends toward a lower-middle and lower class population with low educational and income levels.

Table 5 reports the additional variance in salary level explained by the socio-economic and experience groups of variables in the stepwise regression

Table 5. Additional Variation in Salary Level Explained by Groups of Variables in Stepwise Regression Analysis

Criterion and Sample	Socio-Economic Status	Experience	All Variables
25%ile Salary			
Total Sample	28.7%	28.2%	61.4%
Metropolitan	49.1	29.3	83.3
Non-metropolitan	8.6	26.2	37.5
50%ile Salary			
Total Sample	42.7	31.5	76.1
Metropolitan	58.8	26.6	88.4
Non-metropolitan	7.8	37.9	46.6
75%ile Salary			
Total Sample	80.8	3.5	86.5
Metropolitan	88.6	1.7	91.5
Non-metropolitan	40.2	6.1	49.3

analysis. A greater proportion of the variance is explained for the metropolitan sub-sample and for the 75th percentile salary level criterion than for the other criteria or for the non-metropolitan sub-sample or the total sample. For all criteria and for the total sample and both sub-samples, virtually all of the variance which is explained, is explained by the socio-economic factor group of variables and by the experience factor group. Despite the fact that the socio-economic group is entered into the analysis first and accounts for one-fourth to one-half of the variance, the experience group still explains over a fourth of the variation for the 25th and 50th percentile salary level criteria. For the non-metropolitan sub-sample, socio-economic status explains very little of the corresponding salary level variance, 8.6 per cent and 7.8 per cent respectively. Experience, on the other hand, accounts for over a quarter of the variance at the 25th percentile

level and well over a third for the 50th percentile level. For the 75th percentile, socio-economic status accounts for almost all of the explained variance, 88.6 per cent in the case of the metropolitan sub-sample. Experience accounts for a relatively minor portion of the variance at this salary level, even for the non-metropolitan counties. The lower amount of total variance explained at the 25th and 50th percentile salary levels and the relative less importance of unit socio-economic factors at those levels can probably be attributed to pressures outside the unit such as those exerted by state and national teachers associations, legislation with reference to minimun salary schedules and tradition.

Socio-economic factors and experience are not totally independent of one another and they behave quite differently for the two sub-samples. In metropolitan areas, high socio-economic status communities place a premium on experience. They tend to employ more experienced people and to pay them relatively more than inexperienced teachers. In non-metropolitan counties, however, experience is associated with units of low socio-economic level. For the metropolitan sub-sample, the zero order correlation between per cent of classroom teachers with 16 to 20 years of experience and median rent is .53. For non-metropolitan areas this correlation is a -.24. Similar relationships can be observed for other socio-economic and experience indices for the two sub-samples.

Because of the extreme differences in the composition of the two sub-samples and in the relationships among variables, the remainder of the analysis will focus on the two sub-samples. Statistics on the total sample are not reported.

Regression coefficients and elasticity. An examination of the regression coefficients shown in Table 6 permits more specific conclusions as to the

Table 6. Regression Coefficients Etc. Derived from a Stepwise Regression Analysis of Community and Teacher Characteristics (Independent Variable) and Level of Teachers Salaries (Dependent Variable) for the Metropolitan and Non-metropolitan Sub-samples

Independent Variable	25th %ile Salary				50th %ile Salary				75th %ile Salary			
	Metro		Non-metro		Metro		Non-metro		Metro		Non-metr	
	Coef.	Stand. Error	Coef.	Stand. Error	Coef.	Stand. Error	Coef.	Stand. Error	Coef.	Stand. Error	Coef.	S E
Socio-Eoncomic Status												
13. % Negro	18.75	20.11	38.44	32.13	21.42	28.80	61.49	37.62	41.38	30.96	108.94[b]	
14. Schooling	-101.18	175.71	-99.56	90.65	-207.17	251.61	-140.91	106.16	-318.38	270.51	-152.77	
15. % emp. mfg.	-2.26	11.96	-.30	4.88	10.83	17.13	7.43	5.72	20.47	18.41	9.15	
17. med. rent	28.14[a]	7.56	5.50	9.37	31.24[a]	10.83	3.94	10.97	53.58[a]	11.64	22.79	
25. % white col.	34.05	23.20	24.33[c]	13.76	41.85	33.23	36.50[b]	16.12	63.36[c]	35.72	20.86	
27. High Read. R.	-21.16[c]	11.81	-2.76	8.00	-24.29	16.91	-8.58	9.37	-25.53	18.18	-3.14	
Cultural Opportunities												
12. Metro Area	---	---	---	---	---	---	---	---	---	---	---	
Teacher Experience												
19. % < 5 yrs.	-51.28[a]	18.85	-26.98[c]	14.72	-80.19[a]	27.00	-22.69	17.24	-27.88	29.03	4.86	
22. % 16-20 yrs.	-25.45	74.45	34.67	26.16	-57.61	106.60	83.82[b]	30.64	-10.03	114.61	73.08[c]	
Teacher Training												
51. % MA or BA+30	-2258.75	2134.38	-1815.34	1699.05	-905.86	3056.40	-1247.07	1989.64	-702.06	3285.93	-1852.30	2
52. %MA+30 or Dr.	-2135.20	1670.83	-1142.12	2946.55	1313.83	2392.61	1580.89	3450.50	3222.60	2572.29	5817.04	4
Constant	8690.16		8309.91		11240.80		8863.23		8517.96		8464.65	
R	.9129[a]		.6121		.9262[a]		.6828[b]		.9568[a]		.7025[b]	
F Ratio	5.001		1.743		6.036		2.541		10.824		2.834	
Stand. Error of Est.	245.17		220.58		351.07		258.30		377.44		351.98	

a = statistically significant at .01 level
b = statistically significant at .05 level
c = statistically significant at .10 level

Table 6. Regression Coefficients Etc. Derived from a Stepwise Regression Analysis of Community and Teacher Characteristics (Independent Variable) and Level of Teachers Salaries (Dependent Variable) for the Metropolitan and Non-metropolitan Sub-samples

Variable	25th %ile Salary				50th %ile Salary				75th %ile Salary			
	Metro		Non-metro		Metro		Non-metro		Metro		Non-metro	
	Coef.	Stand. Error	Coef.	Stand. Error	Coef.	Stand. Error	Coef.	Stand. Error	Coef.	Stand. Error	Coef.	Stand. Error
ic Status												
	18.75	20.11	38.44	32.13	21.42	28.80	61.49	37.62	41.38	30.96	108.94[b]	51.26
ng	-101.18	175.71	-99.56	90.65	-207.17	251.61	-140.91	106.16	-318.38	270.51	-152.77	144.66
nfg.	-2.26	11.96	-.30	4.88	10.83	17.13	7.43	5.72	20.47	18.41	9.15	7.79
t	28.14[a]	7.56	5.50	9.37	31.24[a]	10.83	3.94	10.97	53.58[a]	11.64	22.79	14.95
col.	34.05	23.20	24.33[c]	13.76	41.85	33.23	36.50[b]	16.12	63.36[c]	35.72	20.86	21.96
d. R.	-21.16[c]	11.81	-2.76	8.00	-24.29	16.91	-8.58	9.37	-25.53	18.18	-3.14	12.77
rtunities												
ea	---	---	---	---	---	---	---	---	---	---	---	---
ience												
s.	-51.28[a]	18.85	-26.98[c]	14.72	-80.19[a]	27.00	-22.69	17.24	-27.88	29.03	4.86	23.49
yrs.	-25.45	74.45	34.67	26.16	-57.61	106.60	83.82[b]	30.64	-10.03	114.61	73.08[c]	41.75
ing												
BA+30	-2258.75	2134.38	-1815.34	1699.05	-905.86	3056.40	-1247.07	1989.64	-702.06	3285.93	-1852.30	2711.21
r Dr.	-2135.20	1670.83	-1142.12	2946.55	1313.83	2392.61	1580.89	3450.50	3222.60	2572.29	5817.04	4701.87
	8690.16		8309.91		11240.80		8863.23		8517.96		8464.65	
	.9129[a]		.6121		.9262[a]		.6828[b]		.9568[a]		.7025[b]	
	5.001		1.743		6.036		2.541		10.824		2.834	
of Est.	245.17		220.58		351.07		258.30		377.44		351.98	

ally significant at .01 level
ally significant at .05 level
ally significant at .10 level

direction and magnitude of influence of each of the variables when considered together. All of the coefficients which are large enough to be significant are either in the socio-economic status group or the teacher experience group.

The signs of the coefficient yield some surprises. Per cent employed in manufacturing,[13] median rent, and per cent white collar are positive as expected for all criteria and sub-samples. Per cent Negro, normally an indicator of lower socio-economic populations, is associated with higher salaries, ceteris paribus. Median years schooling and the per cent of first graders scoring in the top three stanines in reading readiness are associated with lower salaries. This was unexpected since these indices are directly related with socio-economic status. Apparently these represent non-monetary benefits of employment. School districts which are low on these two indices must pay an equalizing difference, ceteris paribus.

Per cent classroom teachers with less than 5 years experience has negative regression coefficients as expected.[14] It is an index of staff inexperience. Per cent classroom teachers with 16 to 20 years of experience, an index of staff maturity, has a positive regression coefficient as expected for the non-metropolitan sub-sample. For the metropolitan sub-sample the regression coefficients for this variable were negative but they were not large enough to be statistically significant. Generally, a mature staff is associated with a high salary level.

For metropolitan areas, median rent, per cent pupils scoring in the top three stanines in reading readiness, and the experience indices are the strongest predictors of teachers salaries. For non-metropolitan units, the only regression coefficient of a socio-economic index to be statistically significant is per cent of the labor force which is white collar. Experience is also a good predictor of salary levels for the non-metropolitan units.

All of the regression equations generated are significant at the .05 level or above with the exception of the equation for the non-metropolitan sub-sample using the 25th percentile criterion.

To give better insight into the effect of the variables upon salary level, elasticity coefficients were computed. These are reported in Table 7. The elasticity coefficient is the percentage change in salary level which would be expected from a one per cent change in the value of an input. Thus, for the metropolitan sub-sample, a unit which has a one per cent higher median years schooling than another would be expected to have a .151 per cent lower 25th percentile salary level. A one per cent higher median rent in a unit would be expected to be accompanied with a .302 per cent higher 25th percentile salary level. From Table 7 it can readily be seen that the most influential factors upon salary are: level of schooling of the population, median rent, per cent white collar workers, and per cent of classroom teachers with less than 5 years teaching experience. Median rental value appears to have the largest positive effect on teachers salary levels. Median years schooling and per cent classroom teachers with less than 5 years experience are the indices having the largest negative influence.

Table 8 shows the expected change in salary in dollars which can be attributed to a change of one standard deviation in the four most influential factors. A difference of one standard deviation in the median rent between two communities can be expected to contribute to a $615 difference in their expected 75th percentile salary levels, assuming both are in metropolitan areas. The standard deviation difference between non-metropolitan units would contribute to only a $150 difference in salary levels. A standard deviation in median rent in the metropolitan sub-sample is $11.43. In the

Table 7. Elasticity Coefficients* of Community and Teacher Characteristics for Metropolitan and Non-metropolitan Sub-samples

Independent Variable	25th %ile Salary		50th %ile Salary		75th %ile Salary	
	Metro	Non-metro	Metro	Non-metro	Metro	Non-metro
Socio-Economic Status						
13. % Negro	.015	.007	.013	.010	.021	.015
14. Schooling	-.151	-.145	-.250	-.170	-.312	-.159
15. % emp. mfg.	-.009	-.001	.036	.025	.056	.027
17. Med. rent	.302	.052	.269	.031	.378	.153
25. % white collar	.220	.124	.218	.153	.268	.076
27. High Read. R.	-.079	-.012	-.073	-.031	-.063	-.010
Cultural Opportunities						
12. Metro area	---	---	---	---	---	---
Teacher Experience						
19. % < 5 years	-.288	-.135	-.364	-.095	-.103	.018
22. % 16-20 years	-.029	.050	-.052	.105	-.008	.075
Teacher Training						
51. % MA or BA+30	-.120	-.087	-.039	-.050	-.027	-.063
52. % MA+30 or Dr.	-.032	-.007	.016	.008	.032	.027

*The elasticity coefficient is the percentage change in salary level expected from a one per cent change in value of an input.

non-metropolitan sub-sample it is $6.62.

Table 8. Salary Change in Dollars Attributed to a Change of One Standard Deviation in Selected Community and Teacher Characteristics for Metropolitan and Non-metropolitan Sub-samples

Independent Variable	+ or -	25%ile Salary		50%ile Salary		75%ile Salary	
		Metro	Non-Metro	Metro	Non-Metro	Metro	Non-Metro
Schooling	-	$133	$ 57	$273	$ 81	$417	$ 87
Med. rent	+	323	37	358	26	615	150
% white col.	+	179	101	220	152	332	87
% <5 yrs.	-	318	117	499	99	173	+22

Partial Correlations. Two types of indices were used to estimate the quality of the teaching staffs in school units. The first is the per cent of teachers of a unit meeting the state's minimum definition of a qualified professional as set forth in its permanent certification requirements. The second are measures of the pupil achievement of a unit in reading and arithmetic. The partial correlation between the three criteria of salary level and 13 criteria of teacher quality are reported in Table 9. The effect of socio-economic status, cultural status, teacher experience, and teacher training have been controlled.

High salaries do appear to purchase a greater proportion of permanently certified teachers. However, this is accompanied by the rather startling finding that high salaries, ceteris paribus, tend to be negatively related to high pupil achievement. The pattern is pronounced for the metropolitan sub-sample. The partial correlations between salary and achievement are consistently negative with above grade level achievement indicated by a "I" in Table 9 and consistently positive with the proportion

Table 9. Partial and Zero Order Correlation Coefficients Between Salary Level and Achievement Level With the Effect of Community and Teacher Characteristics Removed

Item*	25th %ile Salary		50th %ile Salary		75th %ile Salary	
	Metro	Non-metro	Metro	Non-metro	Metro	Non-metro
Partial Correlation						
30. % IR3	-.34	.13	-.43	.34[a]	.12	.36[a]
32. % IIIR3	.28	-.28[b]	.44	-.11	.21	-.02
33. % IA3	-.44	.05	-.55[b]	.07	-.44	.01
35. % IIIA3	.35	-.16	.46	-.16	.44	.01
36. % IR6	-.31	.16	-.42	.12	-.10	.12
38. % IIIR6	.28	-.38[a]	.40	-.18	.00	-.11
39. % IA6	-.43	-.03	-.65[a]	-.06	-.68[a]	-.27[b]
41. % IIIA6	.36	-.01	.67[a]	-.01	.38	.19
42. % IR9	-.13	-.24	-.11	-.20	-.30	-.40[a]
44. % IIIR9	.21	.17	.20	.11	.31	.31[a]
45. % IA9	-.10	-.40[a]	.00	-.12	-.16	-.18
47. % IIIA9	-.02	.39[a]	.11	.18	.13	.29[b]
10. % perm. cert.	.30	.03	.21	.15	.14	.12
Zero Order Correlation						
30. % IR3	-.05	-.02	-.11	.11	-.13	.25
32. % IIIR3	.07	-.21	.24	-.10	.37	.01
33. % IA3	-.11	-.04	-.21	.00	-.29	.06
35. % IIIA3	.10	-.12	.27	-.09	.45[b]	.05
36. % IR6	-.02	.13	-.10	.17	-.11	.23
38. % IIIR6	.05	-.30[b]	.20	-.24	.30	-.14
39. % IA6	.09	.04	-.04	.03	-.24	-.22
41. % IIIA6	.02	-.11	.25	-.11	.46[b]	.19
42. % IR9	-.03	-.18	-.05	-.13	-.13	-.12
44. % IIIR9	.01	.10	.07	.07	.21	.10
45. % IA9	.11	-.42[a]	.06	-.26	-.18	-.14
47. % IIIA9	-.05	.43[a]	.14	.34[b]	.42[b]	.24
10. % perm. cert.	.37	.31[b]	.20	.39[a]	-.14	.01

*Code:

I = high three stanines
III = low three stanines
R = reading achievement

A = arithmetic achievement
3 = third grade
6 = sixth grade
9 = ninth grade

a = significant at the .01 level
b = significant at the .05 level

below grade level indicated by a "III". The partial correlations between the 25th and 50th percentile criteria and both reading and arithmetic achievement scores are strong enough to be statistically significant at the .05 level or above for the total sample at grade 9. Underachievement in arithmetic at grade 3 and overachievement in arithmetic at grade 6 are significantly related to salary level at the 75th percentile following the described pattern. In interpreting these statistics, it is important to keep in mind that one of the factors which has been controlled is an index of pupil input: per cent scoring in the top three stanines in reading readiness at grade 1 (entered as an index of socio-economic status).

Because of its small size, the metropolitan sub-sample requires a larger F ratio to be significant at the .05 level. The only relationships which meet this standard are measures of achievement in arithmetic at grade 3 and grade 6 with the 50th and 75th percentile salary levels. These relationships are consistent with the overall pattern of being negative with high achievement and positive with low achievement. Even though the other partial correlations are not significant, the pattern holds.

The non-metropolitan units at the elementary level produce a pattern which more closely resembles the expected one. Here the partial correlations tend to be positive with high achievement and negative with low achievement. The ninth grade pattern, however, is the same as for the metropolitan sub-sample.

Table 9 also presents the zero order correlations between the level of teachers salary criteria and pupil achievement measures. Of those partial correlations which are significant at the .05 level or above, the relationship is generally stronger than that indicated by the zero order correlation.

Conclusions

The findings reported above are synthesized below into a set of conclusions by relating the relevant findings to each hypothesis posed in this study.

H1. Teachers salaries will vary directly according to the general socio-economic status of school districts (counties).

Teachers salaries are strongly influenced by the socio-economic characteristics of a unit, especially at the upper range (75th percentile) and in metropolitan areas. This was shown by the large proportion of salary variance explained by socio-economic factors and by their significant regression coefficients. The relationship is not always a direct one, i.e., high socio-economic status being associated with high teachers salaries. There is a counter influence, probably caused by the more pleasant working conditions generally associated with higher socio-economic status. These appear to serve in part as a trade-off for monetary rewards. This effect is shown by the negative regression coefficients of median years schooling and proportion of children in the top three stanines in reading readiness. Thus, variation between teachers salaries and district socio-economic status is not always direct; however, strong relationships exist between teacher salaries and measures of school district socio-economic status.

H2. Teachers salaries will vary inversely with the general cultural status of school districts (counties) once the effect of their socio-economic status has been removed.

There is no substantiation of this hypothesis from the evidence accumulated in this study. Although there were strong positive zero order relationships between the index for cultural status and levels of teachers salaries, all the variation was accounted for by socio-economic factors. This may be because of the inadequacies of the measure of cultural status.

It was assumed that theatre, opera, music, institutions of higher education, museums and the various societies associated with each were concentrated in metropolitan units. To a large extent this is true but all non-metropolitan units are not devoid of such opportunities and not all metropolitan units are equally endowed with them.

H3. Teachers salaries will vary directly with teacher experience once the effect of school districts' (counties') socio-economic and cultural statuses have been removed.

The variance accounted for by experience factors and the strength of their regression coefficients provides strong evidence supporting this hypothesis. The influence is strongest for the lower and middle range of salaries (25th and 50th percentiles).

H4. Teachers salaries will vary directly with the level of teacher training once the effect of school districts' (counties') socio-economic, cultural and teacher experience statuses have been removed.

Little evidence was produced supporting this hypothesis. Teacher training has little independent effect upon salary level. As a matter of fact, although not significant, the regression coefficients for training level indicate a slight depressant effect upon teachers salaries at the 25th percentile. This is not too surprising in that a large number of highly trained teachers place a high demand on available resources thereby decreasing the amount available for teachers with less training. Higher trained persons also tend to be more experienced.

H5. The quality of school districts' (counties') teaching staffs will vary directly according to teachers salaries once the effect of the districts' (counties') socio-economic, cultural, teacher experience, and teacher training statuses have been removed.

The most significant findings of this study pertain to this hypothesis. They will be discussed in considerable detail.

The rather consistent pattern for the metropolitan sub-sample and at the ninth grade level for the non-metropolitan sub-sample of negative partial correlation coefficients between salary levels and pupil achievement, having controlled for socio-economic status of the unit and level of teacher experience and training, are dramatic and cannot easily be dismissed. They lead to the rejection of the fifth hypothesis, not because there is no relationship between the level of teachers salaries and the quality of teaching staff, other factors being controlled, but because the direction of the relationship is opposite that hypothesized. The partial correlations point to the conclusion that the quality of teaching staff and salary level is inversely related, ceteris paribus! If this is true, the general salary policy in the State of New York is counter-productive.

Early in this report the differences were noted between wage determination in the private sector and for schools in the public sector. The primary differences are that 1) the production function in education is little understood and 2) there is no convenient output measure, such as profit, upon which to maximize results. In the absence of these two conditions, wage determination in education is made on the basis of financial means and taste preferences, much the same as individuals select styles of furnishings for their homes or clothing for themselves. In education, taste preferences closely reflect the socio-economic status of a school district. Financial means are determined primarily by the value of their taxable real property in a school district, modified somewhat by state and federal aid policies. Socio-economic status of districts and the value of their taxable real property are strongly and positively correlated, accounting in part for the fact that socio-economic indices explain such a large proportion of the variance in salary levels.

High socio-economic units appear to prefer professional personnel who are experienced. They pay experienced professional personnel relatively higher than they do their inexperienced or less experienced personnel. A re-examination of the zero order correlations of Table 3 indicates that for metropolitan areas, per cent of classroom teachers with less than 5 years experience (inexperience) tends to be negatively associated with indicators of high socio-economic status while per cent 16-20 years experience (maturity), is positively correlated. The reverse is true for the non-metropolitan sub-sample as reported in Table 4.

An analysis of the zero order relationships between experience and the various achievement indices produced further disconcerting results. The correlations are reported in Table 10. Per cent classroom teachers with 16 to 20 years experience is strongly and positively correlated with high achievement (I) for the metropolitan sub-sample and strongly and negatively correlated with low achievement (III). The inverse relationships exist for per cent with less than five years experience. For the non-metropolitan sub-sample, the relationships are weak and mixed at the elementary level. At the ninth grade level, however, the pattern which develops is the inverse of the metropolitan sub-sample. High achievement is associated with inexperienced teaching staffs and low achievement is associated with experienced staffs.

While spectacular, these findings are not isolated. In a study published in 1961, Swanson had observed this phenomenon. He noted that some teachers appeared to profit from experience while others did not. Those who profit, gravitate toward higher expenditure and higher socio-economic level communities--in the present study, the suburban units in the metropolitan sub-sample. The experienced teachers in the remaining districts, according to the Swanson study, tended to be of below average quality. He wrote:

Table 10. Zero Order Correlations Between Two Indices of Teacher Experience and Pupil Achievement for Metropolitan and Non-metropolitan Sub-samples

Item*	% classroom teachers with less than five years experience		% classroom teachers with 16-20 years experience	
	Metro	Non-metro	Metro	Non-metro
30 % IR3	-.42	.12	.66	-.12
32 % IIIR3	.50	.19	-.65	-.27
33 % IA3	-.45	.04	.61	-.03
35 % IIIA3	.51	.12	-.57	-.15
36 % IR6	-.43	.06	.69	.14
38 % IIIR6	.50	.16	-.71	-.28
39 % IA6	-.60	-.20	.51	.17
41 % IIIA6	.59	.32	-.61	-.21
42 % IR9	-.24	.08	.43	-.13
44 % IIIR9	.31	.02	-.38	.09
45 % IA9	-.43	.12	.40	-.27
47 % IIIA9	.54	-.15	-.53	.26

*Code:

I = high three stanines
III = low three stanines
R = reading achievement
A = arithmetic achievement
3 = third grade
6 = sixth grade
9 = ninth grade

> It appears that the school systems at the upper level of expenditure are able to recruit selectively ... and to retain their experienced personnel of high caliber. Systems at the lower level seem subject to a "dreg effect." Their teachers of high caliber are drained off and they are left with the residue. [15]

He further noted that low expenditure districts with young staffs averaged better on his criteria of school quality than did low expenditure districts with experienced staffs.

The 1966 study by Doino, cited previously, proveide additional insights on this effect. Doino examined the movement of experienced teachers within the eight counties of Western New York. Rural areas suffered a net loss of 79 teachers or 30% of all experienced teachers moving from one type of district to another within the area. The core cities suffered a net loss of 55 teachers or 21% of all movers. On the other hand, 103 or 40%, moved to upper-middle class suburbs, a net gain of 67 teachers. The effect for rural areas was primarily quantitative in that the characteristics of their incoming and outgoing groups did not differ greatly. For core cities the effect was both quantitative and qualitative. The group of experienced teachers leaving core cities excelled the groups of teachers leaving upper-middle class suburbs, blue collar suburbs, small cities and rural areas on such characteristics as years of training, breadth of undergraduate studies, and domestic and world travel. The group leaving the core cities excelled the group entering them on 8 of 9 characteristics popularly associated with high quality teachers.[16]

All of this suffests that, in metropolitan areas, the experienced people are attracted to high socio-economic status is removed, the positive relationship between experience and pupil achievement becomes negative. For the

non-metropolitan sub-sample, achievement and experience tend to be negatively related. The upper socio-economic suburban units are drawing many of the best experienced people (as popularly defined) from both the central cities and from the non-metropolitan areas. Experienced people in the non-metropolitan areas and in core cities, tend to be the residue described in Swanson's study. This accounts for the negative zero order relationships between teacher experience and pupil achievement in the non-metropolitan sub-sample and for the corresponding positive relationships in the metropolitan sub-population. In recognizing teacher experience as a factor for determining salaries, the single salary schedule does not recognize the qualitative aspects of experience.

Because of the serious implications of these findings, an analysis (unanticipated in the study proposal) was made of the interaction between the salary criteria, teacher characteristics, community characteristics and selected achievement measures for the total sample. This was accomplished through a stepwise regression analysis run against two achievement criteria, per cent of pupils scoring in the top three stanines in reading achievement, grade 6, and the corresponding index for grade 9. The independent variables were all of the indicators of teacher characteristics and community characteristics (prior to selection) plus the three salary levels (used in the former analyses as criteria). Order of entrance of independent variables into the solution was not specified. At the sixth grade level none of the salary level indices entered the solution! Fifty-five per cent of the variance in reading achievement was accounted for by the grade 1 reading readiness index. Ten per cent of the additional variance was explained by median home value and another ten per cent was explained by per cent of classroom teachers with 16 to 20 years of experience. All of these factors,

including experience, contributed positively to achievement. Seventy-seven per cent of the total variance was explained.

At the ninth grade level only 40 per cent of the total variance in pupils' reading achievement was explained. Of the factors with significant regression coefficients, per cent white collar explained 3.9 per cent of the additional variance; median rent, 1.3 per cent; 75th percentile salary level, 3.7 per cent; 50th percentile salary level, 1.9 per cent; and the per cent holding a doctor's degree or a master's degree plus 30 additional hours of graduate credit, 2.5 per cent. The grade 1 reading readiness index accounted for 13 per cent of the variance, but the regression coefficient was not significant. It is important to note that the sign of the regression coefficient of the 50th percentile salary level was positive, but the sign of the regression coefficient for the 75th percentile salary level was negative, once again suggesting that high salaries at the 75th percentile level, are negatively related to achievement, ceteris paribus. There is other evidence, independently determined, which suggests that these findings are not unique.

In a reanalysis of the Coleman data,[17] Levin noted that Negro children (largely lower socio-economic) were more responsive to teacher experience than were white children. Each additional year of teacher experience was associated on the average with a .105 gain in student verbal score for Negroes compared to a .060 gain for whites. He concludes:

> Teacher experience appears to be twice as effective per dollar of expenditure for Negro students as it does for white ones. Giving equal weights to point gains for whites and Negroes, the schools might wish to assign their more experienced teachers to the schools attended by Negro students for higher total yields. That is, the more experienced teachers should be redistributed to the Negro schools.[18]

Levin also noted that teachers' verbal ability was strongly related to pupil

verbal score for both Negroes and whites. Each additional unit of teacher verbal score was associated with an increase of .175 in the verbal score for Negro students and of .179 for white students.

In a related study, Hanushek found that teacher verbal score and experience were the two teacher characteristics to be consistently related to theverbal scores of sixth grade pupils. He concluded that the teacher effect is greatest for children of white manual labor and Negro parents and that it is somewhat less for children of white non-manual labor parents.[19]

Yet, existing teacher salary practices lead to the migration of the better of the experienced teachers and of teachers with high verbal ability to units where they have the least effect upon children--high SES suburbs. Additional studies pointing to the irrational allocation of resources to factors of production in education follow.

Igoe made an analysis of monetary inputs and achievement scores for school districts in the original Quality Measurement Project sample in New York State.[20] He controlled for socio-economic status by dividing the total sample for each district into three groups, middle, lower-middle and lower socio-economic status (SES). He divided financial inputs into eleven categories such as general control, supervision and principals, etc. All eleven expenditure categories had positive zero order correlation coefficients with pupil achievement of the middle SES group. For the two lower SES groups, however, ten of the eleven were negatively correlated. There is too much intercorrelation of independent variables to put much stock in these zero order correlations without further analysis; however, one must be impressed with the overall consistency of the pattern.

Swanson subjected the Igoe data to a stepwise regression analysis using monetary input measures as independent variables and general achievement

measures as the criteria.[21] He found that expenditure per pupil for starting teachers salaries (BA degree and no experience on the single salary schedule) had significant positive regression coefficients for the middle and low-middle SES sub-samples with elasticity coefficients of .112 and .032 respectively. Teacher training had a significant and negative regression coefficient with an elasticity of a -.124 for the middle SES sub-sample. Expenditures for teacher training had non-significant regression coefficients for the low-middle SES sub-sample as did all teacher-related expenditures for the low SES sub-sample.

Nephew made an analysis similar to that of Igoe's, using Project Talent data drawn from schools in the northeastern section of the United States.[22] Nephew's criteria were 22 factors of achievement from the cognitive and motive domains. Swanson also subjected the Nephew data to a stepwise regression analysis using his input measures as independent variables and four of his achievement measures, verbal knowledge, mathematics, scholasticism, and leadership as criteria.[23] District differences in socio-economic status were controlled by entering Project Talent's Socio-Economic Environment Index as an independent variable. Starting teachers salaries had significant regression coefficients in the resulting equations for all but the leadership criteria. The regression coefficients for teacher training and experience expenditures (combined) were not significant at the .05 level for any of the criteria.

In another reanalysis of the Quality Measurement Project data, Kiesling came up with conclusions similar to those of Igoe.[24] He found that expenditure-performance relationships are weak once IQ and socio-economic status have been controlled. Kiesling also found that, except for children of high socio-economic status, expenditure and achievement are negatively related. High expenditure school districts appear to do a poorer job of educating lower

socio-economic children than do low expenditure districts. Even for high socio-economic status children expenditure does not make much difference in their achievement although the relationship between cost and achievement is higher at the lower grades. Although Kiesling did not deal with salary factors directly, approximately 70% of the expenditure measures he did use were for professional salaries and his findings are consistent with those studies which did use specific measures of salaries.

The evidence is not conclusive, but it is consistent among the better controlled studies and should cause grave concern to those who are responsible for formulating educational policy and who are entrusted with stewardship over the public purse. It points to an apparently high degree of inefficiency in using monetary resources to procure professional services. From an economic viewpoint, the determination of teachers salaries is irrational. Intensive investigations into the production functions of education are critically needed so that the allocation of resources to factors of production, including teachers, can be made on a rational basis. More knowledge is also needed about the effect of salary policies on the ability of a unit to attract from the labor market persons with desirable teacher characteristics.

Summary of Findings and Conclusions

The investigators summarize below the findings and conclusions of this study.

1. Teachers salaries are determined irrationally from an economic perspective.

    1.1 Teachers salaries are not determined on the basis of conditions prevailing in the labor market.

    1.2 Teacher salaries are made in the absence of information on

how teacher qualities contribute to the learning process.

1.3 As a result of 1.1 and 1.2 above, teachers salaries are not paid in a manner that maximizes educational benefits received from the resources consumed.

2. The experience effect upon teacher salaries is relatively independent of the community effect at the 25th and 50th percentile levels. This is probably due to outside pressures such as those exerted by state and national teachers associations, legislation with reference to minimum salary schedules, and tradition.

3. Among school unit salaries there is less variation at the lower salary levels (25th and 50th percentiles) than at the higher levels (75th percentile). This probably reflects outside pressures listed in the second conclusion, tailored only slightly to socio-economic factors.

4. The 75th percentile salary levels appear to be determined almost solely on the basis of consumer preferences as reflected by socio-economic status of units and are negatively related to pupil achievement, ceteris paribus, at all grade levels for the metropolitan sub-population and at the ninth grade level for the non-metropolitan sub-sample.

5. At the lower levels, teachers salaries appear to be largely determined by external pressures such as those exerted by teachers associations, state policy and tradition. The socio-economic nature of school units appear to be highly influential in determining the upper reaches of teachers salaries. It is the latter which appears to be a significant source of inefficiency in the use of educational resources.

Paul Mort likened the school executive to a railroad engineer sitting in the cab of a locomotive confidently manipulating the levers, switches and gauges which surround him. Like the engineer, each school executive has a

set of instruments which he routinely manipulates under the assumption that they positively affect the operation of the school. There is an important difference however. Unlike the engineer, the school executive has no assurance that his "levers, switches, and gauges" are connected to anything or even as to whether or not the school is progressing forward.

This study has produced additional evidence that at least some of the most relied-upon administrative "levers" are not connected to anything which positively affects pupil behavior. Its findings, for example, suggest that expenditures for teacher experience can contribute positively to pupil achievement if properly allocated, but that expenditures on teacher training contribute little.

The State of New York--or any other state for that matter--needs no longer to tolerate such ignorance. Research tools are available which are powerful enough to provide some insight as to what factors of production, including teacher characteristics, are most effective in positively influencing pupil behavior. Further and extensive research of this kind definitely appears warranted and promises significant improvement in the rationality of expenditures for public school education.

Footnotes

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3. R. Oliver Gibson and Herold C. Hunt. The School Personnel Administrator. Boston: Houghton Mifflin, 1965, pp. 283-287.

4. Henry M. Levin. "Recruiting Teachers for Large City Schools." (Unpublished manuscript, Stanford University, 1968). See especially Chapter 6, "Quality of Teachers' Services and Salaries."

5. Ibid., p. 8-7.

6. Ibid., Chapter 7, "The Quality of Teachers' Services and Salaries Analyzed by Sex and by Race of Teachers."

7. Ibid., Chapter 5, "The Misallocation of Teachers by Subject Field."

8. Ibid., p. 5-35.

9. Robert K. Hasler. "A Study of Selected Factors Associated with Rejection of Public School Teaching as a Career by Teacher Education Graduates," (Unpublished Ed.D. Dissertation, State University of New York at Buffalo, December, 1968).

10. Robert E. Rentschler. "Teacher Mobility Between the Major Metropolitan Areas of New York State." (Unpublished Doctor of Education dissertation, State University of New York at Buffalo, 1970).

11. Rocco R. Doino. "The Movement of Teachers Within A Major Economic Region." (Unpublished Doctor of Education dissertation, State University of New York at Buffalo, 1970).

12. Ibid., p. 61.

13. Except for the metropolitan and non-metropolitan sub-samples for the 25th percentile salary level criterion.

14. Except for the 75th percentile salary level criterion for the non-metropolitan sub-sample.

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17. James S. Coleman, et. al.. Equality of Educational Opportunity. Washington: U. S. Government Printing Office, 1966.

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23. Op. cit..

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